REMARKS

By the *Office Action* of 30 March 2005, Claims 1-13, 45-46, and 49-51 are pending in the application, an all rejected. By the present *Response and Amendment*, Applicant amends Claims 1, 3-6, 8-12, 45-46, and 49-51, and leaves unchanged Claims 2, 7, and 13.

No new matter is believed introduced by the present *Response and Amendment*. It is respectfully submitted that the present Application is in condition for allowance for the following reasons.

1. Interview

Applicant and Applicant's attorney thank the Examiner for the telephone interview on 14 July 2005. All Claims were discussed, and no agreement was reached on the Claims.

2. Amendments to the Claims

The following Claim amendments are submitted herein, each alone believed to present novel and non-obvious Claims over the cited art:

A. An Impervious Non-Cementitious Reinforcement Membrane

Amended independent Claims 1, 8, and 45 now include the limitation that the impervious membrane of the lower principal surface is a **non-cementitious reinforcement** membrane. This recitation is fully supported in the application as-filed, and it is respectfully submitted that neither Mathieu, Dinkel nor Galer disclose such a membrane. Indeed, the cited art teaches away from this novel feature.

Additionally, independent Claim 1 now includes the limitation that the core is a **cementitious** core having an upper and lower principal surface. The upper principal surface of the cementitious core is inherently a cementitious bonding surface, after the construction element has been manufactured. Neither Fhamy nor Flack discloses a cementitious core. Furthermore, neither Fhamy nor Flack discloses a cementitious bonding surface. Thus, Claim 1 is believed novel and non-obvious over Fhamy and Flack.

B. A Pervious Cementitious Bonding Surface Remaining on the Upper Principal Surface of the Core after the Manufacture of the Construction Element

Amended independent Claims 8 and 45 now include the limitation that **a pervious bonding surface on the upper surface of the core remains after the construction element has been manufactured**. This recitation is fully supported in the application as-filed, and it is respectfully submitted that neither Fhamy, Flack nor Nicoll Jr. disclose such a bonding surface.

C. Structural Construction Element

Amended independent Claim 45 now includes the limitation that the construction element is a **structural** construction element, being of such structural integrity as to be used as an underlayment or backerboard that typically are used to support tile, marble, slate, granite, and other heavy materials. This recitation is fully supported in the application as-filed, and it is respectfully submitted that neither Fhamy nor Flack disclose such a structural construction element.

D. Water Impervious Paperboard

Amended dependent Claims 4 and 10 now include the limitation that the lower impervious membrane includes a **water impervious** paperboard, instead of a waterproof paperboard. It is believed this limitation is not found or suggested in the cited references. Indeed, Nicholl Jr. teaches away from a water impervious paperboard.

3. The Cited Art Neither Discloses, Teaches Nor Suggests An Impervious Non-Cementitious Reinforcement Membrane

Amended independent Claims 1, 8, and 45 recite a construction element having, among other things, an impervious non-cementitious reinforcement membrane. Prior art constructions over which the present invention improves upon use common backerboard manufacturing techniques, wherein the reinforcement mesh (typically a pervious reinforcement layer) must be embedded in cementitious slurry in order to be sufficiently bonded to the cementitious core after manufacture and curing of the backerboard.

For example, referring directly to the Mathieu reference cited by the Examiner:

> The term "slurry" is to be understood as referring to a flowable mixture, e.g. a flowable mixture of water and hydraulic cement. *Col. 1, ¶2, Lines 4-7.*

Mathieu continues to describe slurry:

> The term "slurry pervious reinforcing mesh" is to be understood as characterizing a mesh as being suitable for use in the preparation of a concrete panel by having openings sufficiently large to permit penetration of a cementitious slurry or a slurry component of a core mix into and through the openings so as to permit (mechanical) bonding of the mesh to the core by either for example by being cemented to the core or by being embedded in a face or surface of the core of the panel. *Col. 1, ¶3.*

After manufacturing, both the upper and lower principal surfaces of the Mathieu backerboard core are faced with a ***pervious*** reinforcement mesh embedded in a ***cementitious***

slurry. Mathieu, thus, teaches that both the upper and lower principal surfaces of the core require a layer of cementitious slurry material.

The present invention does away with the slurry on the lower principal surface as described by Mathieu, (*see* Mathieu *Fig. 9, reference numeral 4*), which limitation is now expressly recited in the amended Claims. Amended independent Claims 1, 8, and 45 recite the present construction element having an impervious non-cementitious reinforcement membrane.

Additionally, and not surprisingly, Mathieu requires a carrier web or sheet to manufacture the backerboard, and thus protects the conveyor from the cementitious slurry on the bottom of the principal surface. That is the very essence of the prior art manufacturing technique that the present invention overcomes. The present invention can be manufactured *without* a carrier web or sheet, as its lower surface is non-cementitious.

Dinkel too teaches that a cementitious slurry is required on the lower principal surface to bond the pervious reinforcement mesh to the core. *See Fig. 2, reference numeral 5.*

Moreover, Galer requires that the pervious reinforcement mesh be embedded in the core material, wherein providing a cementitious lower principal surface. *See Fig. 4, reference numeral 14*. The carrier sheet (*see Fig. 4, reference numeral 13*) must also be used to protect the conveyor from the cementitious lower principal surface.

It is respectfully submitted that Mathieu, Dinkel, and Galer all teach away from the present invention, as all of the Claims now expressly recite that the lower surface has an impervious non-cementitious reinforcement membrane. That is, this present invention *eliminates* the prior art need of having a *cementitious* material on the lower principal surface.

4. The Cited Art Neither Discloses, Teaches Nor Suggests A Pervious Cementitious Bonding Surface Remaining On The Upper Principal Surface Of The Core After The Manufacture Of The Construction Element

Amended independent Claims 8 and 45 include a pervious cementitious bonding surface remaining on the upper principal surface of the core after the manufacture of the construction element. With the amended Claim 45, the present invention is not only asymmetrical due to upper and lower principals having different water permeation properties, but also asymmetrical because the upper principal surface is a pervious cementitious bonding surface, and the lower surface is an impervious non-cementitious surface. The pervious cementitious upper principal surface provides a high strength bond with Portland cement mortars and mastics used to bond tile

and tile-like materials. The impervious non-cementitious lower principal surface provides the ability to manufacture without the use of a carrier web or sheet.

The Examiner states that Mathieu discloses an asymmetrical panel, by referring to **Fig. 9** of that reference. It is understood by those in the art that **Fig. 9** is but a snapshot in time of the fabrication of the panel, which when complete, is in fact a symmetrical panel. Thus, Mathieu does not teach or suggest an asymmetrical panel of the present invention as claimed in Claims 8 and 45. As recited in ¶211 of Mathieu:

> FIGS. 7 to 11 illustrate in schematic cross sectional views ***steps in the formation*** of another example panel in accordance with the present invention having a U-shaped edge reinforcing mesh. *Emphasis added.*

The Examiner alleges, for example, that Mathieu discloses a prefabricated asymmetrical construction element without an upper slurry layer:

> Mathieu (fig 9) discloses a prefabricated asymmetrical construction element (see below) having a core (10) having an upper principal surface and a lower principal surface, the element being asymmetrical in design such that a layer or layers on the upper principal surface differ in arrangement from the layer or layers on the lower principal surface (inherently so as the lower surface include the slurry cement layer), the upper principal and the lower principal surface of the core having different moisture-resistant layers respectively (inherently per the slurry cement layer), the different moisture resistant layers having different moisture resistant properties. *Office Action, Page 6.*

Yet, the Mathieu backerboard is symmetrical, and contains a pervious mesh embedded in a pervious cementitious slurry on both principal surfaces of the core.

In a seeming contradiction to the rejection that Mathieu discloses a prefabricated asymmetrical construction element *without* an upper slurry layer (Examiner's statement above), The Examiner appears to state the opposite on Page 2 of the *Office Action*:

> Mathieu (fig 9) discloses a prefabricated construction element having a core (10) having an upper principal surface and a lower principal surface, alkaline resistance fiber to be used with Portland cement, having additive of expanded shale (Col. 10, Line 3, third paragraph), a pervious upper reinforcement material on the upper principal surface of the core, a cement slurry binding the reinforcement layer on the upper surface of the core, an upper coating/cement slurry in communication with the upper principal surface of the core and the pervious upper reinforcement material, the layer comprising a fiberglass mesh with an alkaline resistant coating selected from a group consisting of woven fiberglass and fiberglass skrim." *Office Action, Pages 2-3.*

Thus, according to the Examiner, the core has a slurry layer on the lower principal surface of the core (*Office Action, Page 3*), and the core has a slurry layer on the upper principal surface of the core (*Office Action, Page 3*). Indeed, Mathieu discloses symmetrical element, having the slurry layer on both sides of the core, not an asymmetrical element as recited in the present Claims 8 and 45.

It is well known in the art of manufacturing cementitious backerboards that the pervious reinforcement mesh must be embedded in a cementitious slurry in order to be sufficiently bonded to the cementitious core after manufacture and curing of the backerboard. Mathieu acknowledges same at ¶2, "The term "slurry" is to be understood as referring to a flowable mixture, e.g. a flowable mixture of water and a hydraulic cement."

Mathieu also states at ¶3:

> The term "slurry pervious reinforcing mesh" is to be understood as characterizing a mesh as being suitable for use in the preparation of a concrete panel having openings sufficiently large to permit penetration of a cementitious slurry or a slurry component of a core mix into and through the openings so as to permit (mechanical) bonding of the mesh to the core either by for example by being cemented to the core or being embedded in the face or surface of the core of panel.

Mathieu at **Fig. 9** merely illustrates that during manufacture, two different methods are used to mechanically bond the reinforcement mesh to the core with a cementitious slurry, (e.g. a flowable mixture of water and hydraulic cement). Inherently, the lower mesh being cemented with a separate slurry coating and the upper mesh being embedded in the core slurry. Yet, ***after manufacture***, both upper and lower principal surfaces of the Mathieu backerboard core are faced with a pervious reinforcement mesh embedded in a cementitious slurry. Thus, both the upper and lower principal surfaces of the core have a layer of slurry material, and both surfaces exhibit the same moisture resistant properties. Mathieu is therefore a symmetrical construction element, as distinguishable by the present Claims.

Mathieu discloses a symmetrical construction element with a pervious reinforcement mesh embedded in a cementitious slurry on both the upper and lower principal surfaces of the core layer, as noted at ¶62:

> In accordance with the present invention a panel may be provided with reinforced broad side face as follows: the web of fabric is deposited onto a supporting web member (e.g. a plastic protective film), a cementitious slurry is fed to the upper surface of the web and then spread uniformly over the web in controlled amount by means of a doctor (blade, bar or roller)

> adjustably spread from the supporting member. The web is drawn out of the slot formed by the doctor and supporting member, thereby applying the desired coating of slurry to the first reinforcing mesh; the core mix is then applied. Then the second web is deposited upon the upper face of the core layer; vibrating the layer of slurry in contact with the fabric or web until the slurry penetrates the web and the latter is completely embedded.

Mathieu embodies the very essence of the prior art that the present application attempts to improve upon. Mathieu discloses ***manufacturing*** a construction element with a membrane covering the conveyor so the conveyor doesn't get soiled, but it does not disclose a construction element ***itself*** having the impervious membrane as recited in the Claims of the present invention. The membrane **2** of Mathieu is nothing more than a carrier for the conveyor, described as a deficiency in the prior art regarding another patent:

> U.S. Reissue Patent No. Re32,037 to Clear is a method for manufacturing cementitious reinforced panels and illustrates a concrete panel **11** having reinforcement layers **12, 13** and a polyethylene layer **20** adjacent one of the layers **12, 13**. Layers **12** and **13** are described as mesh reinforcing elements, preferably constituting fiber mesh like pervious webs, each entrained in hydraulic cement. Layer **20** is a carrier sheet placed under reinforcing element **12** during manufacture. Yet, such methods of constructing backerboards are not only deficient because they produce an inferior wet-area panel, but also because they require the use of a carrier sheet. *See Application Publication (US 2002/0170648 A1), Pg. 1, ¶7.*

Similarly, while membrane **2** appears in many of the **Figs.** of Mathieu, Mathieu discloses that the membrane **2** is ***not*** part of the final construction element or panel, but (just like Clear), this membrane **2** is only a temporary film membrane that protects the cementitious lower surface of the panel from the conveyor belt or support structure during the manufacturing process. This temporary film membrane is typically referred to in the art as a carrier sheet or carrier web. Yet, it is an object of the present invention to rid this requirement of the prior art use of a carrier web:

> The present method of constructing the backerboard dispenses with the prior art requirement of a carrier sheet or web. *See Application Publication, Pg. 1, ¶12.*

In addition, the cited art does not teach a construction element having ***only one*** impervious membrane. The Examiner states that "Fahmy (*Col. 2, Lines 53-58*) discloses a single impervious polymer membrane layer (22) remaining on the lower principle surface of the core (2) after the manufacture of the element to act as a water barrier." *Office Action, Page 7.*

Independent Claims 1 and 45 recite a construction element having ***only one*** impervious membrane, that being located on the lower principal surface of the core. While the Examiner is

technically correct that Fahmy discloses a single layer 22 (among other layers), that is not what is recited in the pending Claims. Claims 1 and 45 recite a construction element limited to only a single layer, while Fahmy discloses more than one layer, and indeed teaches away from the use of only one such layer. The *Office Action* appears silent to the patentability of a construction element as claimed herein, with only one impervious membrane on the lower principal surface of the core.

There is no suggestion to modify Fahmy to teach only a single imperious membrane, nor can Fahmy be used as a suggestion to modify another reference to include only a single impervious membrane, as that is not what Fahmy teaches. Fahmy teaches away from the use of only a single such layer.

Referring directly to the language the Examiner cites, Fahmy at *Col. 2, Lines 53-58* states:

> The permeable resin layers 16 and 22 may comprise conventionally known "breathable" (permeable) resins made from polyesters, polyurethanes, acrylic polymers, polyethers, ester-ether copolymers, and the like, as well as blends and copolymers thereof.

This language, and the figures of Fahmy, emphasize that the Fahmy element has at least ***two*** permeable membrane layers (16) and (22). That is, while the Fahmy discloses a "membrane (22) being a single polymer membrane layer," as noted by the Examiner, this is inapposite the question of whether Fahmy teaches or suggests a single layer, or more than one. The pending Claims 1 and 45 restrict the present invention to just one, while Fahmy discloses the use of at least two.

Nowhere in the Fahmy patent is layer (22) referred to as the ***only*** polymer membrane layer. Furthermore, in every part of Fahmy, layer (22), the lower polymer membrane, is immediately preceded by a reference to layer (16), the upper polymer membrane, or the polymer membranes are referred to as layers (plural).

Further, the Examiner mischaracterizes the "core" of Fahmy. The Examiner alleges that the layer of paperboard (22) is a "core" as the term is used in the present Claims, when actually the center layer of paperboard (12) is the core of Fahmy, analogous to the present invention.

Fahmy states:

> The composite sheathing material 10 comprises a core layer of paperboard 12, a first layer of paperboard 14 having a first layer of a permeable resin 16 on a surface thereof, said first layer of paperboard 14 being adhered to the

> core layer of paperboard 12 by means of a first adhesive layer 18 therebetween, and a second layer of paperboard 20 having a second layer of a permeable resin 22 on a surface thereof, said second layer of paperboard 20 being adhered to the core layer of paperboard 12 by means of a second adhesive layer 24 therebetween. *Col. 2, Lines 11-20.*

Fahmy requires that two layers of impervious membranes (16) and (22) be used, one on each side of the core (12), in order to construct a composite sheathing with liquid water impermeability and water vapor permeability. Thus, Fahmy teaches away from the present Claims that recite the construction element has only one impervious membrane.

Further evidence of the requirement that Fahmy have at least two such layers is found at *Col 3, Lines 12-17*:

> Thus, while liquid water is prevented from passing through the composite sheathing material due to the presence of resin layers 16 and 22, water vapor nevertheless is able to pass through the permeable resin layers 16 and 22 and through the apertures 26 of the first and second adhesive layers 18 and 24.

Thus Fahmy teaches that both resin layers 16 and 22 must be present to prevent liquid water from passing through the composite sheathing material.

As shown in the present *Specification*, "[b]ackerboards have textured cementitious surfaces that provide for a high strength bond with mastics and Portland cement mortars that are used to adhere tile to the substrate in wet areas." *See Application Publication, Pg. 1, ¶5, Lines 6-9.* It is also well known in the tile industry that one should never attempt to bond tile to a cementitious or concrete substrate which has previously had a polymer impervious resin sealer applied to its bonding surface. Filling the pervious cementitious bonding surface with polymer resins severely reduces the bonding strength of the setting mortar.

Fahmy teaches that both principal surfaces of his composite sheathing material ***must*** both have polymer impervious sealing resins applied. Yet, applying impervious resins to both sides of the core of the present invention would render it useless as a tile backerboard because the present asymmetrical backerboard invention would no longer benefit from an impervious moisture barrier membrane on the lower side of the core and a pervious cementitious bonding surface on the upper side of the core.

Fahmy consistently teaches a symmetrical composite sheathing material with a polymer membrane layer adhered to ***both*** upper and lower principal surfaces of the paperboard core, while teaching away from the present asymmetrical backerboard invention that has an

impervious membrane on only the lower principal surface of the core, and a pervious cementitious layer on the upper principal surface of the core.

5. The Cited Art Neither Discloses, Teaches Nor Suggests A Structural Construction Element

Amended independent Claim 45 recites the limitation that the construction element is a structural construction element.

It is well known in the industry that concrete backerboards are structural substrates which are used to support tile, marble, slate, granite, and other heavy materials. The present application describes structural elements – "This invention relates generally to a composite structural panel," *see Application Publication, Pg. 1, ¶2*, and "the concrete backerboard is a superior substrate or underlayment for stucco, ceramic tile, marble, and other tile-like surfaces" *see Application Publication, Pg. 1, ¶4.*

The Fahmy reference describes a sheathing board, but the board is not a *structural* panel or underlayment. The Fahmy sheathing board lacks reinforcement and can not be used to support heavy tile or tile-like surfaces, as backerboards support. Fahmy teaches away from manufacturing a structural concrete backerboard and should not be combined with Mathieu.

In addition, the Flack reference is not a structural panel or underlayment. With the soft foam core and lack of reinforcement layers, the Flack invention can not be used to support heavy tile or tile-like surfaces, as backerboards support. Thus, Flack teaches away from a structural backerboard and should not be combined with Mathieu.

6. Nicoll Jr. does not teach a water impervious paperboard

Amended dependent Claims 4 and 10 include a water impervious paperboard, instead of a waterproof paperboard. "An impervious material may enable water vapor to penetrate through a material." *See Application Publication, Pg. 2, ¶24.*

The Nicoll Jr. reference teaches a waterproof paperboard required to float a boat. The present invention requires a vapor breathable material that is impervious to water penetration. Nicoll Jr., thus, teaches away from the type of paperboard required by the present invention.

7. **Claims Rejections under 35 U.S.C. § 103**

All the pending Claims are rejected under 35 U.S.C. § 103(a) as being unpatentable over the combination of Mathieu, Dinkel and Fahmy. In view of the amended Claims, the Applicant believes these grounds of rejections have been overcome.

8. **Fees**

This *Response and Amendment* is being filed within six months and a three-month extension of time request is enclosed herewith.

Authorization to charge deposit account No. 20-1507 is hereby expressly given in order to pay the three-month extension fees ($510 for small entity). Although no further fees are believed due, authorization is also given to charge additional fees, should they be deemed due.

CONCLUSION

By the present *Response and Amendment*, the Application has been in placed in full condition for allowance. Accordingly, Applicant respectfully requests early and favorable action. Should the Examiner have any further questions or reservations, the Examiner is invited to telephone the undersigned Attorney at 404.885.2773.

Respectfully submitted,

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Certificate of transmittal under 37 CFR § 1.8
I hereby certify that this correspondence is being submitted by facsimile to 571 273 8300 to the United States Patent and Trademark Office, in accordance with 37 C.F.R. § 1.8 on the below date.

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